

What is claimed is:

1. A ceramic catalyst comprising a ceramic carrier capable of supporting a catalyst component directly on a surface thereof, a catalyst component supported on a surface of the ceramic carrier, and at least two layers of promoter components formed on the ceramic carrier, wherein an outermost layer of the layers comprises a promoter component having the highest heat resistance among the promoter components.
2. A ceramic catalyst according to claim 1, wherein the ceramic carrier has many pores, and an innermost layer of the layers of promoter components is formed on inner surfaces of the pores.
3. A ceramic catalyst according to claim 1, wherein the ceramic carrier has many pores, and an innermost layer of the layers of promoter components is formed on inner surfaces of the pores as well as on an outer surface of the ceramic carrier.
4. A ceramic catalyst according to claim 1, wherein at least one of the promoter components comprises an oxygen storage component.
5. A ceramic catalyst according to claim 4, wherein the oxygen storage component is an oxide or multiple oxide comprising at least one element selected from the group consisting of lanthanoides, Y, Zr and Hf.
6. A ceramic catalyst according to claim 1, wherein the outermost layer of the layers of promoter components comprises a Zr-rich ceria/zirconia solid solution.
7. A ceramic catalyst according to claim 1, wherein an innermost layer of the layers of promoter components comprises a ceria or a Ce-rich ceria/zirconia solid solution.
8. A ceramic catalyst according to claim 1, comprising three layers of promoter components, wherein an innermost layer of the layers comprises a ceria, an intermediate layer of the layers comprises a Ce-rich

ceria/zirconia solid solution, and an outermost layer of the layers comprises a Zr-rich ceria/zirconia solid solution.

5 9. A ceramic catalyst according to claim 1, wherein the ceramic carrier comprises a ceramic material, a part of atoms of at least one component element of the ceramic material are replaced by atoms of a non-component element, and the catalyst component is supported on the non-component element.

10 10. A ceramic catalyst according to claim 9, wherein the catalyst component is supported on the non-component element by chemical bond.

15 11. A ceramic catalyst according to claim 9, wherein the non-component element is at least one element having a d or f electron orbit.

20 12. A ceramic catalyst according to claim 1, wherein the ceramic carrier comprises a ceramic material selected from the group consisting of cordierite, alumina, spinel, mullite, aluminum titanate, zirconium phosphate, silicon carbide, zeolite, perovskite, and silica-alumina.

25 13. A ceramic catalyst according to claim 1, wherein the ceramic carrier has many cavities and the catalyst component can be supported directly in the cavities.

30 14. A ceramic catalyst according to claim 13, wherein the cavities comprise at least one of defects in a ceramic crystal lattice, fine cracks of ceramic surface, and deficiencies of atoms of component element of the ceramic material.

 15. A ceramic catalyst according to claim 14, wherein the width of the fine cracks is not more than 100 nanometers.

35 16. A ceramic catalyst according to claim 13, wherein the cavities have a diameter or width of not more than 1000 times as long as that of an ion of the catalyst component supported, and there are not less than 1×10^{11}

cavities per liter.

17. A ceramic catalyst according to claim 14,
wherein the ceramic material comprises cordierite, and
the cavities comprise defects formed by replacing a part
5 of component element of the cordierite with a metallic
element having a different valence.

18. A ceramic catalyst according to claim 17,
wherein the defects comprise at least one of oxygen
defects and lattice defects, and the cordierite contains
10 not less than 4×10^{-6} percents of cordierite crystals
having at least one defect in a unit crystal lattice.

19. A ceramic catalyst according to claim 1,
wherein the ceramic carrier is in at least one shape
selected from the group consisting of honeycomb, pellet,
15 powder, foam, fiber, and hollow fiber.